Low Impact Dwellings

Low Impact Development (LID) is development which through its low negative environmental impact either enhances or does not significantly diminish environmental quality. In his book Low Impact Development, Dr Larch Maxey outlines the defining characteristics:

- **locally adapted, diverse and unique**
- **made from natural, local materials**
- **of an appropriate scale**
- **visually unobtrusive**
- **enhancing biodiversity**
- **based on renewable resources**
- **autonomous in terms of energy, water and waste**
- **increasing public access to open space**
- **generating little traffic**
- **linked to sustainable livelihoods**
- **co-ordinated by a management plan**

Substantial research has concluded that LID represents some of the most innovative and sustainable development in the UK. The University of the West of England undertook an extensive research project involving a study of 5 existing LID projects.

The final report Low Impact Development - Planning, Policy and Practice, published in 2002 stated:

> "Sustainability is central to the concept of LID and a key concern of most of those living on or wishing to live on a LID. From the evidence collected by this study it is clear that LID makes strong contributions to the environmental aspects of sustainability. Its contribution to the social aspects is also significant. LID's contribution to the economic aspects of sustainability is more modest but also positive.
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> What is most striking is that LID makes positive contributions to all three aspects of sustainability together, without trading off against each other. In this respect LID appears to be an intrinsically sustainable form of development. LID's weakest contribution is economic, but it is arguable that LID does not set out to make large monetary contributions to the economy, as it is a subsistence-based livelihood."

Baker Associates, an independent firm of town planners and development consultants based in Bristol published a report in 2004 entitled Low Impact Development - Further Research, which expanded on these findings:

> "What features strongly in most thinking on LID is that LID involves the developer / occupier in a high degree of engagement with the land and the resources that working the land can provide, something that can represent a very responsible approach to the use of the planet's resources. Significantly the relationship with the land may also establish the need to be in that location rather than anywhere else...
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> **These are characteristics that chime with aims that are desirable because they promote greater sustainability, such as having a small environmental and resource 'footprint', and possibly meeting social and economic needs locally."**

Design

A low impact dwelling is a structure that is built using materials that have a small ecological footprint and are recycled or locally produced, such as earth, straw-bale, wood, recycled windows, perlite, stone and lime.

The design of the dwellings must have a humble appearance in the landscape. The area of each dwelling will be optimised to be as efficient as possible relative to the amount of persons they need to house. Smaller spaces are preferable in terms of heating, and visual and physical impact. What determines the size of the dwellings are the specific workers' needs relative to their activity on the land. The projects will be self-build driven but with consultation with a qualified ecological builder.

Materials

The immediate materials available on the land or in the local area are wood, stone, earth and straw, sheep's wool, and a bit further afield, lime. This means the dwellings will be built from the above materials but will be variable in terms of design, e.g. wooden cabins with sheep's wool insulation or straw-bale structures with turf roofs.

Other structures will be light frame canvas structures such as yurts and benders. These are particularly suitable for volunteers and temporary workers.

Construction

The construction process will be manual. This will allow the buildings to be constructed with a low impact on its immediate environment and will minimise the embodied energy of the dwellings by minimising transportation of materials and fuel use.

Many natural building materials are in abundance on site, including building wood and a large volume of good quality clay for making cob or wattle and daub.

Size

The exterior physical footprint of the dwellings will range from a minimum of 10 m2 to a maximum of 25 m2, all single story dwellings.

Insulation and Heating

Each dwelling will be fitted with an efficient wood burning stove, such as the rocket mass heater with secondary combustion and thermal mass accumulators to minimise fuel use. Where appropriate, passive solar design will ensure that the dwelling will be absorbing as much of the sun's thermal energy available throughout the day.

Examples

There are many examples of Low Impact Developments with planning permission around the country. Details of these can be seen in Appendix A, Relevant Planning Precedents. The following are examples of common LID buildings:

Roundhouses

The roundhouse is a type of house with a circular plan, originally built in western Europe, using walls made of stone or wooden posts joined by wattle-and-daub panels, and a conical thatched roof. Roundhouses ranged in size from less than 5m in diameter to over 15m.

In the later part of the 20th century modern designs of roundhouse eco-buildings started to be built using techniques such as cob, cordwood or straw bale walls and reciprocal frame green roofs.

Straw Bale Structures

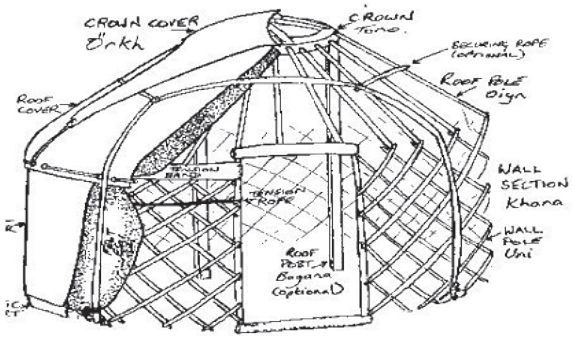
Straw-bale construction is a building method that uses bales of straw (commonly wheat, rice, rye and oats straw) as structural elements, building insulation, or both. This construction method is commonly used in natural building projects. Research has shown that straw-bale construction is a sustainable method for building, from the standpoint of both materials and energy needed for heating and cooling.

Advantages of straw-bale construction over conventional building systems include the renewable nature of straw, cost, easy availability, naturally fire-retardant and high insulation value.

Yurts

A yurt is a portable, bent dwelling structure traditionally used by nomads in the steppes of Central Asia. The structure comprises a crown or compression wheel, usually steam bent, supported by roof ribs which are bent down at the end where they meet the lattice wall (again, steam bent). The top of the wall is prevented from spreading by means of a tension band which opposes the force of the roof ribs.

The structure is traditionally covered by layers of fabric or canvas with sheep's wool felt for insulation and weatherproofing.



Benders

A bender is a simple shelter, made using flexible wooden poles or withies, such as those coppiced from hazel or willow. These are lodged in the ground, then bent and woven together to form a strong dome-shape. The dome roof is then covered using canvas or tarpaulin and insulated.

These structures can be heated during the winter using a woodburning stove, and they are easily capable of withstanding very strong winds so long as the covers are well tied down.

Earth Roof Cabins

A green roof or living roof is a roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane. It may also include additional layers such as a root barrier and drainage and irrigation systems.

Green roofs serve several purposes for a building, such as absorbing rainwater, providing insulation, creating a habitat for wildlife, increasing benevolence and decreasing stress of the people around the roof by providing a more aesthetically pleasing landscape.